

Swift Observations of GRB 111018A

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1. INTRODUCTION

At 17:26:24 UT the Swift Burst Alert Telescope (BAT) triggered on GRB 111018A (trigger 505801). Swift slewed immediately to the burst and found a bright, uncatalogued X-ray source (Marshall *et al.* GCN Circ. 12450). The best Swift position for this burst is the XRT enhanced position (Goad *et al.* GCN Circ. 12453) of RA (J2000) = 18h 05m 57.25s and Dec (J200) = -03d 54' 26.2" with an uncertainty of 2.0".

No optical afterglow was detected with UVOT, and no optical afterglow was reported from ground-based observatories.

Standard analysis products for this burst are available at http://gcn.gsfc.nasa.gov/swift_gnd_ana.html.

2) BAT OBSERVATION AND ANALYSIS

The BAT ground-calculated position (Cummings *et al.* GCN Circ. 12457) is RA (J2000) = 18h 05m 55.6s and Dec (J2000) = -03d 52' 48.5" with an uncertainty of 2.0' (90% containment radius including both statistical and systematic errors).

The mask-weighted light curve (Figure 1) shows a couple of overlapping peaks starting at $\sim T-4$ sec, with peaks at $\sim T-1$ sec and $\sim T+22$ sec, and ending at $\sim T+35$ sec. T_{90} (15-350 keV) is 36 ± 5 sec (estimated error including systematics).

The time-averaged spectrum from T-4.08 to T+37.30 sec is best fit by a simple power-law model. The power law index is 2.18 ± 0.27 . The fluence in the 15-150 keV band is $4.0 \pm 0.7 \times 10^{-7}$ erg cm⁻². The 1-sec peak photon flux measured from T+21.71 sec in the 15-150 keV band is 0.4 ± 0.1 ph cm⁻² sec⁻¹. All the quoted errors are at the 90% confidence level.

3. XRT OBSERVATIONS AND ANALYSIS

The XRT began observing GRB 111018A about 115 sec after the BAT trigger (Mangano & Marshall GCN Circ. 12455). The initial 37 sec of data were taken in Windowed Timing (WT) mode, and the remainder were taken in Photon Counting (PC) mode. The best XRT position is reported in Section 1. The light curve can be modeled as a power-law decay with a decay index of 0.97 ± 0.05 .

A spectrum formed from the PC mode data can be fitted with an absorbed power-law with a photon spectral index of 1.8 (+0.8, -0.7). The best-fitting absorption column is $1.2 (+0.8, -0.6) \times 10^{22}$ cm⁻², in excess of the Galactic value of 2.5×10^{21} cm⁻² (Kalberla *et al.* 2005). The counts to observed (unabsorbed) 0.3-10 keV flux conversion factor deduced for this spectrum is 6.7×10^{-11} (1.2×10^{-10}) erg cm⁻² count⁻¹.

4. UVOT OBSERVATIONS AND ANALYSIS

UVOT began settled observations of the GRB 111018A 132 sec after the BAT trigger, and no afterglow was detected in any of the UVOT filters (Breeveld & Marshall GCN Circ. 12459). The preliminary 3- σ upper limits using the UVOT photometric system (Poole *et al.* 2008, MNRAS, 383, 627) are given in Table 1. No correction has been made for the expected extinction in the Milky Way corresponding to a reddening of $E_{B,V}$ of 2.16 mag. in the direction of the GRB (Schlegel *et al.* 1998).

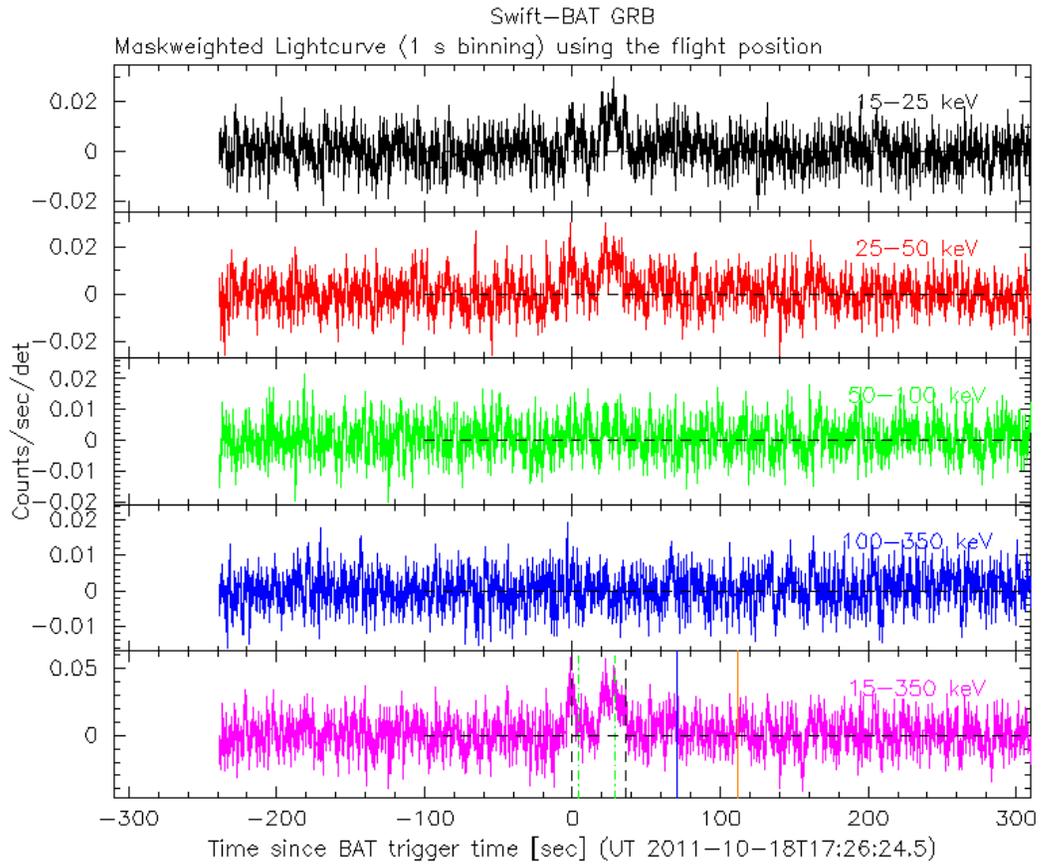


Figure 1: The BAT light curve in multiple energy bands.

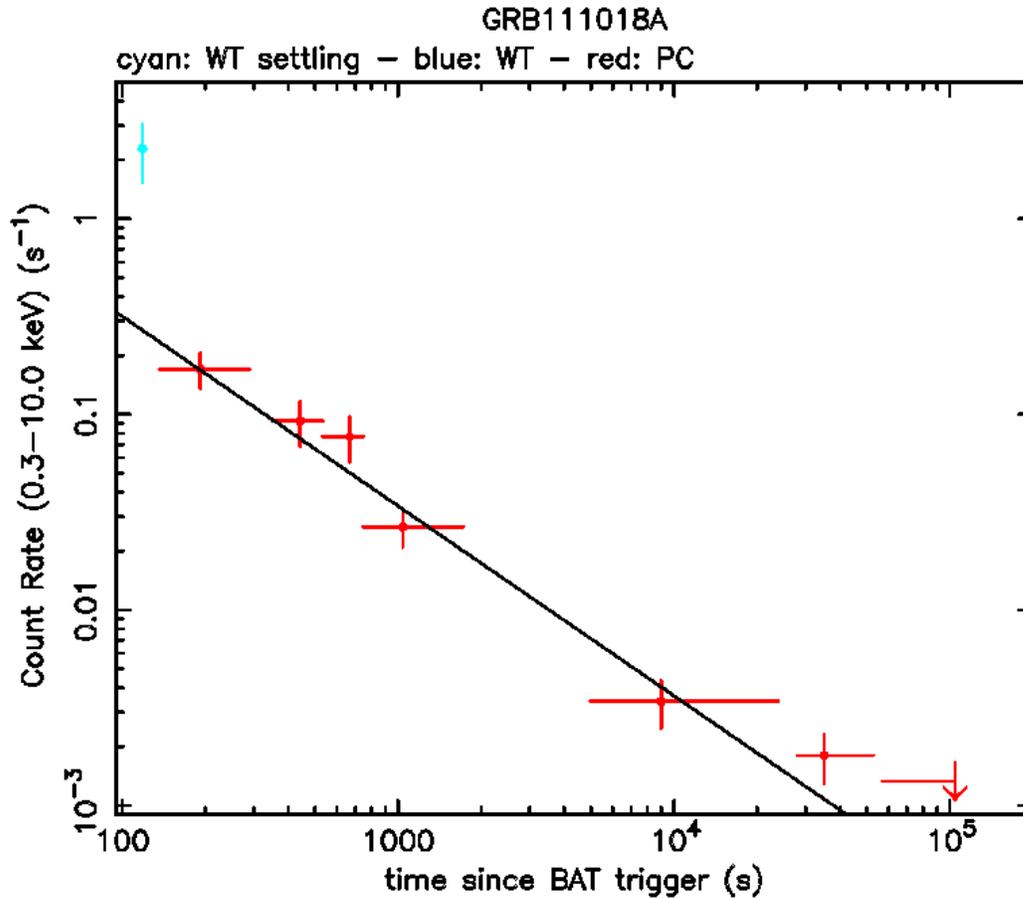


Figure 2: The XRT light curve. The WT settling data are in cyan, and the PC mode data are in red.

Filter	T_{start}	T_{stop}	Exposure	Magnitude
	(seconds)	(seconds)	(seconds)	
white (FC)	132	282	147	>21.1
white	132	7508	653	>21.8
v	462	12028	673	>20.2
b	388	6000	333	>20.9
u	291	5794	329	>20.6
uvw1	512	5590	314	>20.4
uvm2	487	5384	333	>20.2
uvw2	438	11672	1040	>21.4

Table 1: UVOT Observations. The start and stop times of the exposures are given in seconds since the BAT trigger. The preliminary 3- σ upper limits are given. No correction has been made for the expected extinction in the Milky Way (Schlegel *et al.* 1998).